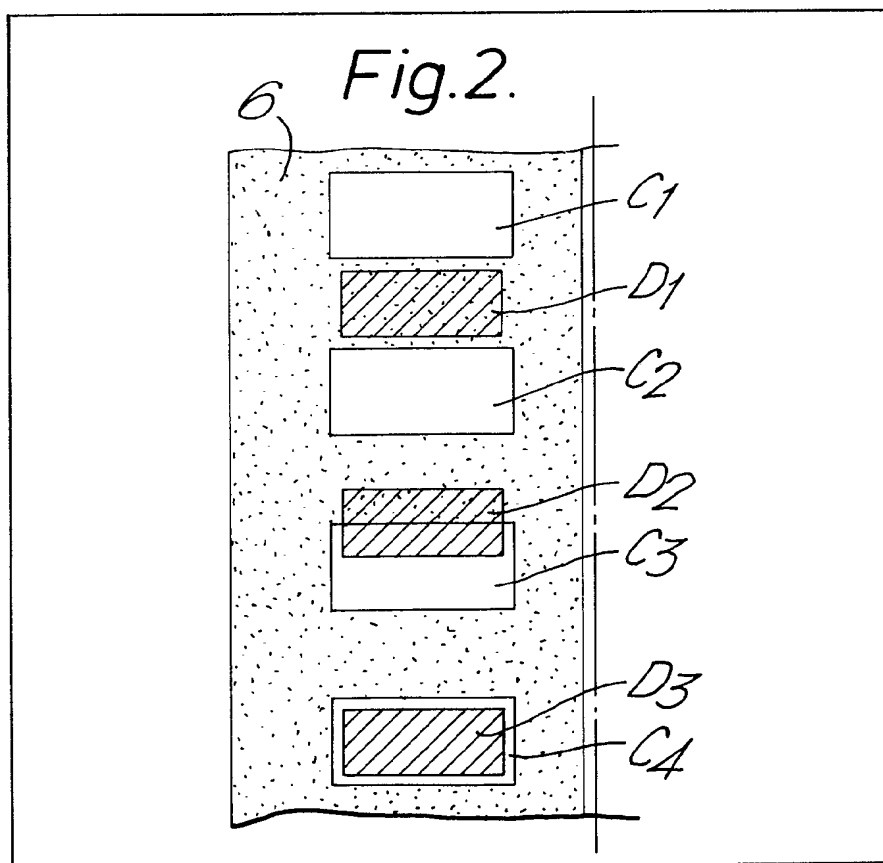


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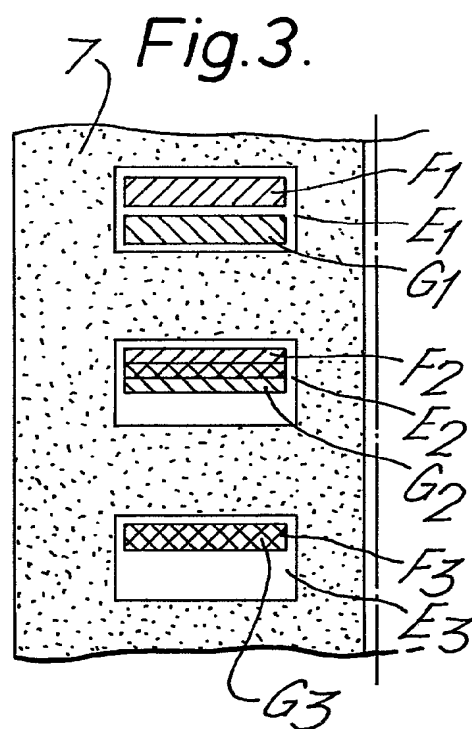
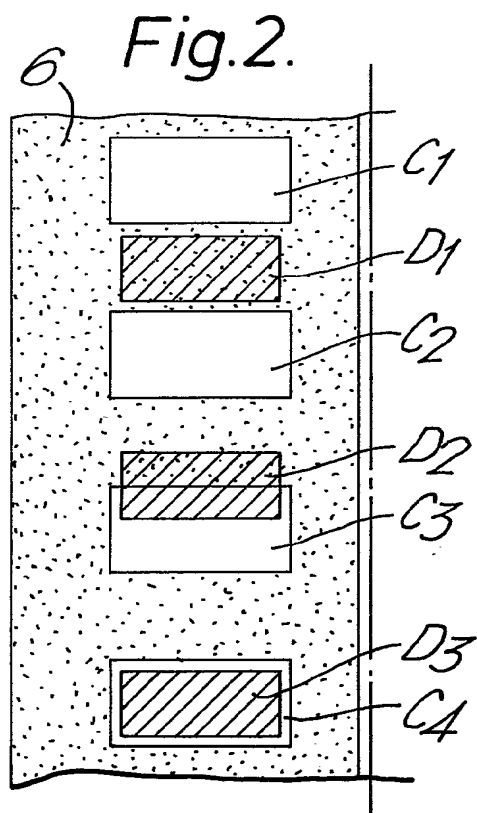
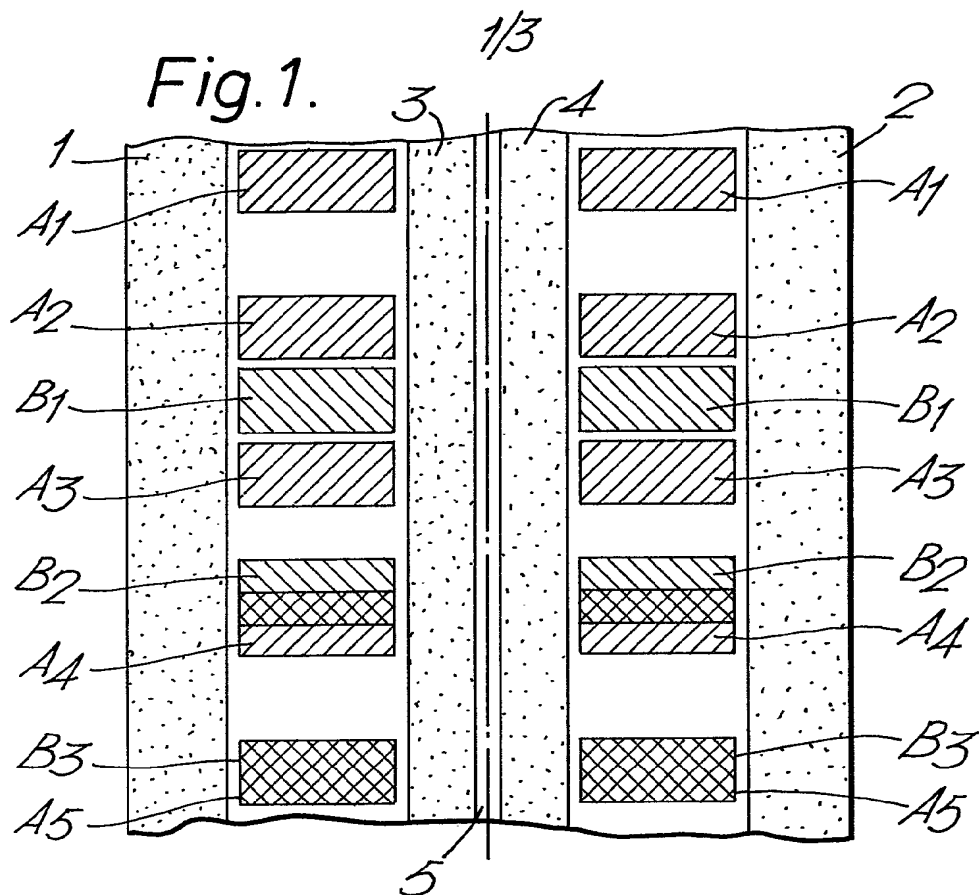
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(54) Application of permeability
reducing materials to smoking article
wrapping materials

(57) Permeability reducing material, an
adhesive for example, is applied to a
web of wrapping material, cigarette
tipping for example, at first and second
areas by first and second applicators
respectively, and the operation of the
applicators relative to each other is
varied in order to vary the amount of
overlap of the first and second areas in
the longitudinal direction of the web,
thus varying the permeability of the
web.



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Fig. 4.

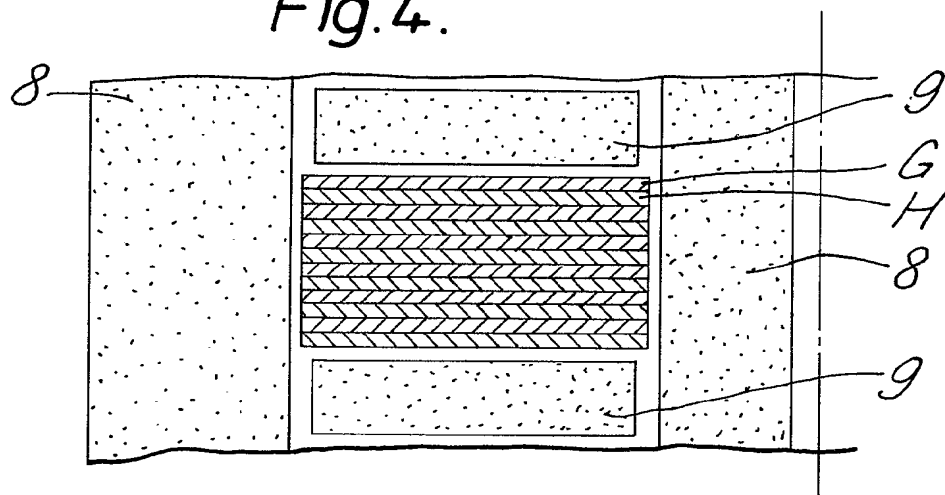


Fig. 5.

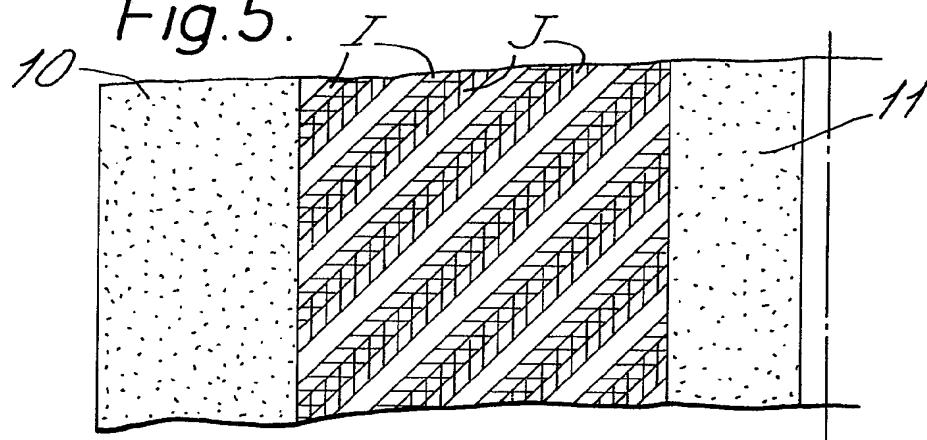


Fig. 6.

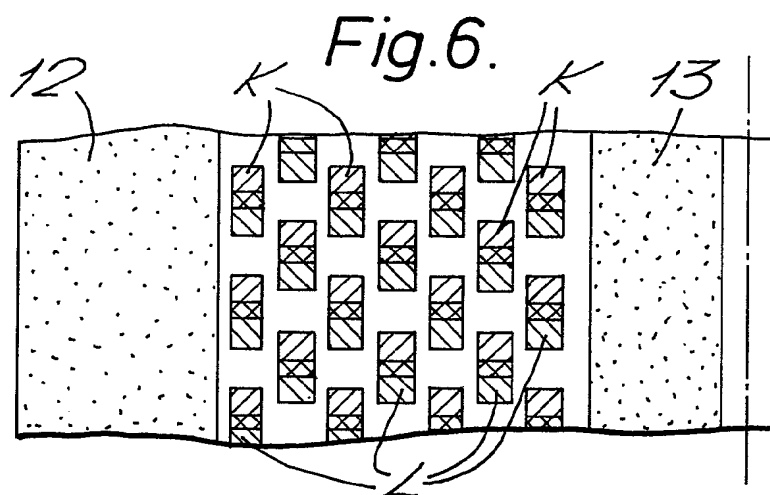
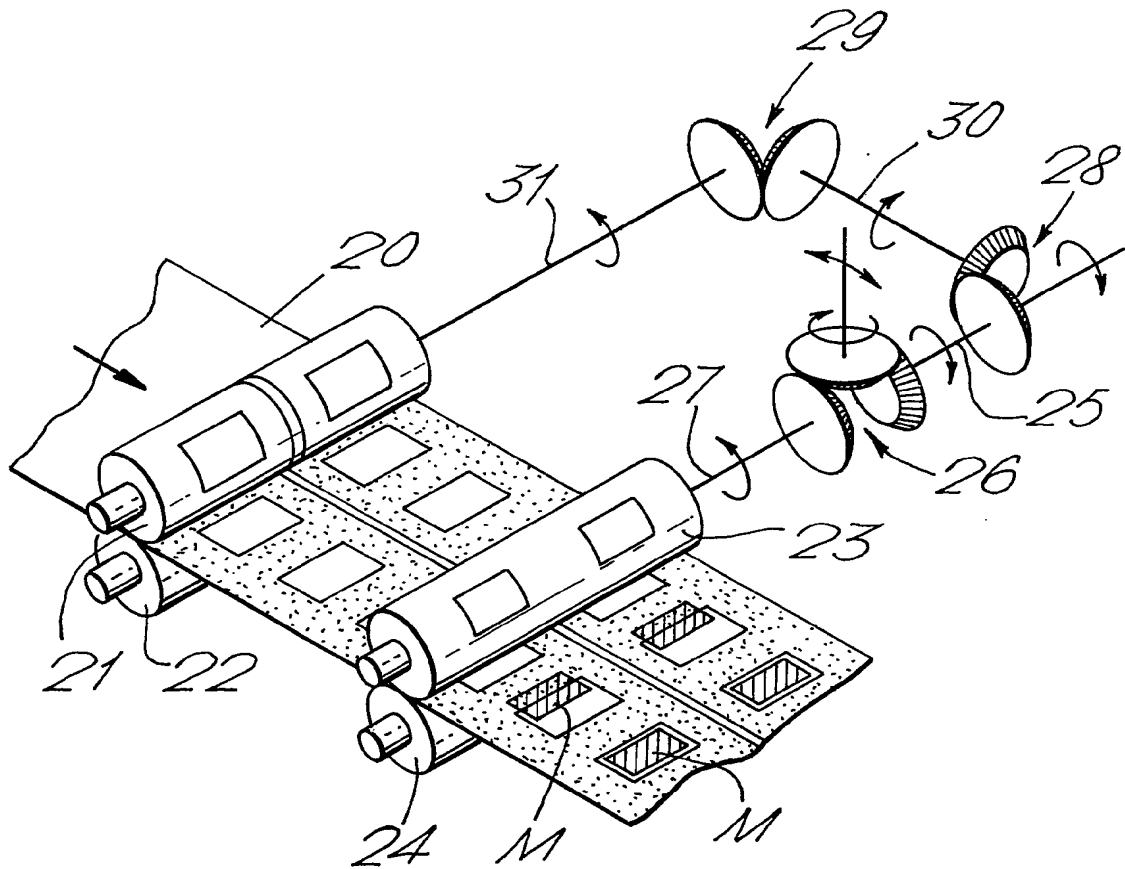


Fig. 7.



SPECIFICATION

Improvements relating to the application of permeability reducing materials to smoking article wrapping materials

This invention relates to a method of and apparatus for applying permeability reducing materials to smoking article wrapping materials.

10 There is disclosed in United Kingdom Patent Specification No. 1,447,191 a process of making a ventilated filter tip, comprising wrapping an inherently porous plugwrap about a filter plug and adhering an inherently porous tipping paper about the plugwrap by means of a multiplicity of randomly positioned, impermeable, discrete areas of adhesive, thus to provide an "open area" for ventilation. As is disclosed in the specification, the fraction of the total area occupied by the discrete areas of impermeable adhesive can be varied by varying certain characteristics of the adhesive used in the filter making process.

It is an object of the present invention to provide a method of and apparatus for applying permeability reducing material to smoking article wrapping material, tipping or cigarette paper for example, providing for ready adjustment of the overall permeability of the wrapping material.

The present invention provides a method of applying permeability reducing material to air permeable smoking article wrapping material wherein a web of smoking article wrapping material is conveyed through respective application zones of first and second applicator means, said first applicator means applying to said web a permeability reducing material at first areas of said web and subsequently said second applicator means applying permeability reducing material at second areas of said web, the amount of overlap of said first and second areas in the longitudinal direction of said web, that is to say the direction of travel thereof, being varied to vary the permeability of said web.

The present invention also provides apparatus for applying permeability reducing material to smoking article wrapping material, comprising first and second applicator means, conveying means operable to convey a web of smoking article wrapping material through respective application zones of said first and second applicator means, said first applicator means being operable to apply permeability reducing material at first areas of said web, each of said areas being of a predetermined configuration and said second applicator means being operable to apply permeability reducing material at second areas of said web, and control means operable to effect variations in the operation of one of said first and second application means relative to the other whereby the amount of overlap of said first and second areas in the longitudinal direction of said web may be varied to vary the permeability of said web. The amount of overlap may be variable in a range of 0-100%.

The second applicator means is preferably disposed to the same side of the path of the web as is the first applicator means so that the second areas of

permeability reducing material are applied to the web on the same side thereof as the first areas of permeability reducing material. The permeability reducing material applied by the first applicator means may be the same as that applied thereto by the second applicator means. Advantageously the permeability reducing material is an adhesive, a hot melt adhesive for example.

In order that the invention may be clearly understood and readily carried into effect reference will now be made by way of example to the accompanying drawings, in which:-

Figures 1-6 show portions of cigarette tipping paper; and

Figure 7 shows a highly diagrammatic view of apparatus operable to apply adhesive to tipping.

Figure 1 shows a portion of the length of a tipping paper web of the usual double width, i.e. a width equivalent to the length of two cigarette tipplings. The continuous speckled lines 1, 2 at the edge margins and the continuous speckled lines 3, 4 disposed closely to each side of the centre line of the web indicate the application of adhesive which in the finished cigarettes extends circumferentially of the tips to adhere the tipping to the underlying plug element and to an end portion of the cigarette paper. The narrow gap 5 between the lines 3 and 4 is the usual dry line at which a knife severs the initially formed double cigarette. Hatched rectangular bars A indicate the application of adhesive by first applicator means at first areas intermediate the pairs of lines 1, 3 and 4, 2. The spacing between the bars A is, as may be seen from Figure 1, approximately equivalent to the transverse dimensions of the bars.

Hatched rectangular bars B, having hatching in a diagonal reverse direction to the hatching of bars A, indicate the application of adhesive by second applicator means at second areas intermediate the pairs of lines 1, 3 and 4, 2. The bars B are applied to the paper web, subsequently to the application thereof of the bars A, by second applicator means adjustable relative to the first applicator means such that bars B may be applied to the web in varying positions relative to the equi-spaced rectangles A. The bars B1 at each side of the web are wholly disposed in the spaces between pairs of bars A2 and A3. The bars B2 are shown as overlapping for half of their transverse dimensions the prior-applied bars A4. As may be seen from Figure 1, the original spaces between the bars A3 and A4 have been half obscured by the application of the bars B2. At the bottom of Figure 1 there is shown the result of so adjusting the second applicator means as to produce a full registration of bars, designated B3, with prior-applied bars A5. The original spaces between the wholly covered bars A5 and the bars A4 are left free of permeability reducing material.

The lines of adhesive 1-4 could be applied to the paper web by means of suitable nozzle applicators. Alternatively, the lines 1-4 could be applied by a roller which may be the same roller which applies the adhesive providing the bars A. In Figure 1 the bars A and B are shown slightly spaced at their ends from the adjacent lines 1-4. However, the bars A and B could abut the adjacent lines of adhesive 1-4, or if

they are applied by means different from the means applying the lines 1-4, the bars A and B could even overlap the lines 1-4.

In Figures 2-6 there are shown for the sake of simplicity only parts of the respective webs to one side of the longitudinal centre lines thereof.

The speckled area shown in Figure 2 depicts adhesive applied by first applicator means to the area of a tipping paper web 6 excepting at rectangular areas C thereof. Rectangular areas D of adhesive, all dimensions of which are slightly less than the dimensions of the adhesive-free areas C, are then applied to the web by second applicator means adjustable in relation to the first applicator means. The uppermost area D1 is disposed wholly between adjacent areas C1 and C2, whereas the area D2 of adhesive has been deposited such that to the extent of half its transverse dimension it overlaps with adhesive-free area C3. As will be appreciated, in the latter case the permeability of the paper web is reduced. The extreme permeability reducing condition is shown by the application of an area D3 to the web wholly in register with an initially adhesive-free area C4.

In the case of both the permeability reducing methods illustrated by Figures 1 and 2 the position of the secondly applied areas (B, D) can be varied in continuous fashion between the extreme positions of total non-registration with a previous area of permeability reducing material of with an area completely lacking such material, to the condition of total registration. For the purpose of providing examples of the present inventive concept, somewhat abrupt changes in position of the secondly applied areas have been depicted in these figures.

The speckled area shown in Figure 3 depicts the application of an adhesive in a pattern the same as that of the speckled area of Figure 2. Next applied to the web is a sealant material, not necessarily an adhesive, to areas F. The areas F are disposed wholly within adhesive-free areas E and are of substantially smaller transverse dimensions than the areas E. Subsequent to the application of the sealant at areas F further sealant material is applied to the web at areas G, of similar dimensions to the areas F, by applicator means adjustable relatively to the applicator means employed for the application of areas F. As may be seen from Figure 3, the areas G too are disposed within the areas E. The area G1 is totally out of register with the area F1, that is to say there is no overlap. Area G2 partially overlaps the area F2, and area G3 is totally in register with area F3. Again, for illustrative purposes somewhat abrupt changes in the positions of secondly applied areas relative to previously applied areas have been shown.

In Figure 4 the tipping web there shown has applied to it longitudinal lines of adhesive as depicted by speckled areas 8, and transverse spaced bars - depicted by speckled areas 9. Within the areas bounded by the lines 8 and the bars 9 by use of first applicator means there are applied a number of lines of sealant, parallel to the bars 9, of narrow transverse dimension, designated G. Second applicator means is employed to apply to the web a second series of narrow transverse lines H of sealant. In

Figure 4 the lines G and H are shown in non-overlapping relation, whereby the maximum permeability-reducing effect is obtained. As will be appreciated, the lines H may be applied, by suitable adjustment of the second applicator means, so that they partially or wholly, overlap with the prior-applied lines G.

Figure 5 shows a portion of tipping web having a marginal line of adhesive 10 and a further longitudinally extending adhesive line 11. Intermediate the lines 10, 11 there is deposited a series of diagonally extending lines of adhesive I and a second similar series of lines of adhesive J. The lines I and J have been shown as partially overlapping, although of course, the degree of overlap could be adjusted between extreme cases of total registration and total non-registration. Since the lines of adhesive I and J extend diagonally off the tipping web, transverse bars of adhesive, such as the bars 9 of the web of Figure 4, are not required. No matter where the web is severed to provide individual cigarette tipplings, sufficient adhesive will be available along the margin of the line of cut to provide an adequately sealed longitudinal tipping seam.

Another mode of applying first and second areas of permeability-reducing material to a tipping web is shown in Figure 6. The tipping web of Figure 6 possesses lines of adhesive 12, 13 between which are applied a multiplicity of rectilinear areas K of adhesive and a further series of rectilinear areas of adhesive L. As may be seen from Figure 6 the areas K form an array of off-set transverse lines. As will be appreciated, the pattern shown in Figure 6 merely exemplifies one pattern of a large number. The size and or spacing of the areas may be varied in many ways.

There is diagrammatically shown in Figure 7 apparatus operable to apply a variable overlap pattern of adhesive to a paper tipping web 20. The web 20 is conveyed (by means not shown) in the direction of the arrow and passes between a first pair of rollers 21, 22, providing first applicator means, and a second pair of rollers 23, 24, providing second applicator means. The roller 21 is provided at its peripheral surface with a printing pattern which results in the application to the web 20 of a pattern of adhesive depicted by the speckled area intermediate the roller 21 and the roller 23. Adhesive is applied to the roller 21 by a transfer roller (not shown). The roller 23 has at its peripheral surface a printing pattern which results in the application to the web 20 of two series of spaced rectangles M which are shown diagonally hatched in Figure 7. A transfer roller (not shown) serves the function of providing adhesive to the roller 23.

A drive motor (not shown) serves to drive a shaft 25 which, via a differential mechanism generally designated 26, imparts drive to a shaft 27 which is coupled to the shaft of roller 23. Drive from the shaft 25 serves also, via pairs of mitre gears 28, 29 and drive shafts 30, 31, to rotate the roller 21. Further drive means (not shown) serves to drive the rollers 22, 24 at the same speed as the rollers 21, 23.

In place of printing pattern rollers, adhesive could be applied to the moving web by means of first and

second assemblies of nozzles associated with respective adhesive supply means relatively controllable to provide for variations in adhesive overlap.

Suitably, the air permeability of the web is monitored at a location downstream of the location of the application of the last applied permeability reducing material and the operation of the first and second application means relative to each other is varied as required to maintain the permeability value within tolerance limits.

CLAIMS

1. A method of applying permeability reducing material to air permeable smoking article wrapping material wherein a web of smoking article wrapping material is conveyed through respective application zones of first and second applicator means, said first applicator means applying to said web a permeability reducing material at first areas of said web and subsequently said second applicator means applying permeability reducing material at second areas of said web, the amount of overlap of said first and second areas in the longitudinal direction of said web, that is to say the direction of travel thereof, being varied to vary the permeability of said web.

2. A method according to Claim 1, wherein the second areas of permeability reducing material are applied to said web on the same side thereof as are applied thereto the first areas of permeability reducing material.

3. A method according to Claim 1 or 2, wherein one of the permeability reducing materials applied respectively to the first and second areas of said web is an adhesive.

4. A method according to Claim 1, 2 or 3, wherein a permeability reducing material is applied to said web in a pattern defining zones free of the material forming the pattern, and the first and second areas extend within said zones.

5. Apparatus for applying permeability reducing material to smoking article wrapping material, comprising first and second applicator means, conveying means operable to convey a web of smoking article wrapping material through respective application zones of said first and second applicator means, said first applicator means being operable to apply permeability reducing material at first areas of said web, each of said areas being of a predetermined configuration and said second applicator means being operable to apply permeability reducing material at second areas of said web, and control means operable to effect variations in the operation of one of said first and second application means relative to the other whereby the amount of overlap of said first and second areas in the longitudinal direction of said web may be varied to vary the permeability of said web.

6. Apparatus according to Claim 5, wherein one of the first and second applicator means comprises an application roller.

7. Apparatus according to Claim 5, wherein one of the first and second applicator means comprises nozzle means.

8. A method of applying permeability reducing

material to smoking article wrapping material, substantially as hereinbefore described with reference to Figure 1, 2, 3, 4, 5, 6 or 7 of the accompanying drawings.

9. Apparatus for applying permeability reducing material to smoking article wrapping material, substantially as hereinbefore described with reference to Figure 7 of the accompanying drawings.

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